

**Summary:**

## **Speed limits in urban areas**

This report discusses issues that are relevant when speed limits in urban areas are to be determined. Three issues that are related to each other are discussed:

- **Insecurity:** To what extent are road users insecure, and in what way can highway agencies promote security in determining speed limits in urban areas?
- **Optimal speed limits:** Which are the optimal speed limits on different types of road in urban areas, and to what extent are optimal speed limits affected by the economic valuation of road user security?
- **Criteria for setting speed limits:** What criteria are currently used to set speed limits, and what should be the criteria to be used in setting speed limits in urban areas?

### **Road user insecurity**

Norwegian studies of road user insecurity were reviewed. The main emphasis was put on empirical studies, that is studies designed to describe the prevalence of insecurity and factors that influence it. A total of 21 studies were included. These studies were published during the years from 1979 until 1998.

The studies show that road user insecurity is rather common. A distinction was made between feeling insecure as a road user and feeling insecure on the behalf of others, particularly children. Insecurity for children is very common. Several studies show that between 50% and 90% of parents state that they would not allow a five year old child to go outside alone, because of the traffic in the neighbourhood. The percentage of parents stating this is very high in urban areas located close to major arterial roads.

Insecurity among road users is most commonly found in pedestrians and cyclists. In general, the majority of car drivers do not feel insecure. However, there is a majority who state that they feel insecure when the road is slippery. There is also a clear majority of older people who state that they dare not go outside on foot as often in winter as in summer, because they are afraid of falling on snow or ice covered surfaces. The feeling of insecurity is related to traffic volume, speed and road user perception of their own skills as road users. The relationship between insecurity and the actual number of accidents, or the accident rate, is complex and has not been extensively studied.

Insecurity is an argument in favour of having low speed limits in urban areas.

No study was found that provides a satisfactory monetary valuation of insecurity.

## Optimal speed limits in urban areas

The optimal speed limit for a given road, is the speed limit that minimises the total costs to society of traffic on that road. These costs include the costs of travel time, vehicle operating costs, accident costs and costs of environmental impacts, including noise and air pollution. Estimates were made of the optimal speed limits on seven types of road in urban areas. Sensitivity analyses were made of these estimates, with particular reference to the economic valuation of insecurity and the shape of the relationship between speed and insecurity.

A baseline economic valuation of insecurity of 0.09 NOK per vehicle kilometre of travel was applied (1 NOK = 0.125 US Dollars). This valuation is obviously highly uncertain, because there are no studies that have valued insecurity. However, at the baseline valuation, insecurity has a minor effect on estimates of optimal speed limits in urban areas. The valuation would have to be raised substantially in order to decisively affect estimates of optimal speed limits in urban areas.

The estimates indicate that the optimal speed limit on major arterial roads is likely be higher than the current general speed limit of 50 km/h for urban areas in Norway. The optimal speed limit on access roads in residential areas is likely to be lower than 50 km/h.

## Criteria for setting speed limits

Current criteria for setting speed limits, given in the road design manual and in the manual on uniform traffic control devices, are described. Criteria that can be derived from the Swedish Vision Zero concept for road accident fatalities, as well as from a previously published report concerning speed limits in rural areas were also reviewed. Although these various sets of criteria have developed on rather different foundations, they do seem to converge, at least in their main features. Five criteria for setting speed limits in urban areas are proposed:

- The transport function a road serves (three levels: arterial, collector, access)
- The cross section of the road (median or no median)
- The degree to which pedestrians and cyclists are separated from motor vehicles (full, partial, none)
- The density of housing (suburban, urban)
- The type of housing (commercial, residential)

Examples showing the use of these criteria to set speed limits are given. It is concluded that the speed limit on major urban arterial roads, with a median and full separation of pedestrians and cyclists, may be higher than the general speed limit for urban areas of 50 km/h. Access roads in residential areas should have a speed limit of 30 km/h. If motor traffic is to be allowed into areas that are used by children to play, it should proceed at walking speed only, at most 15 km/h.